

## WHAT IS CLAIMED IS:

- 1           1.     A method of regulating a requested volume of liquid in a liquid  
2     handling pipette by correcting for a current physical condition at the pipette,  
3     the method comprising:  
4           selecting a requested volume at a pipette, the pipette including a piston  
5           drive mechanism, the piston drive mechanism configured to  
6           contact a piston assembly to move a piston rod of the piston  
7           assembly within a tip holder thereby causing regulation of an  
8           amount of liquid in the tip holder, the requested volume  
9           representing the amount of liquid to regulate;  
10          calculating a correction volume using a volume characterization,  
11          wherein the volume characterization characterizes a difference  
12          in the amount of the liquid regulated in the tip holder as a  
13          function of the requested volume, the volume characterization  
14          determined using a calibration process; and  
15          displaying the correction volume to a user of the pipette thereby  
16          regulating the requested volume of liquid in the tip holder.
- 1           2.     The method of claim 1, further comprising:  
2     determining a parameter, the parameter representing a current  
3     physical condition at the pipette;  
4     wherein the volume characterization further characterizes a difference  
5     in the amount of the liquid regulated in the tip holder as a  
6     function of the parameter.
- 1           3.     The method of claim 2, wherein the parameter is a type of tip.
- 1           4.     The method of claim 2, wherein the parameter is measured by a  
2     --sensor mounted at the pipette.
- 1           5.     The method of claim 4, wherein the parameter is selected from  
2     the group consisting of a temperature of the atmosphere at the pipette, a

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3 temperature of a portion of the pipette, a pressure of the atmosphere at the  
4 pipette, a pressure within a cavity of the pipette, a humidity of the atmosphere  
5 at the pipette, and a viscosity of the liquid.

1 6. The method of claim 2, further comprising displaying the  
2 requested volume to the user of the pipette.

1 7. The method of claim 1, wherein the correction volume is an  
2 actual volume, the actual volume representing the amount of liquid regulated  
3 in the tip holder based on the requested volume.

1 8. The method of claim 1, wherein the correction volume is a  
2 regulation error, the regulation error representing a difference between the  
3 requested volume and an actual volume, the actual volume representing the  
4 amount of liquid regulated in the tip holder based on the requested volume.

1 9. The method of claim 8, further comprising the user selecting a  
2 new volume at the pipette, wherein the new volume includes the regulation  
3 error.

1 10. The method of claim 8, further comprising displaying a high/low  
2 indicator to a user of the pipette, the high/low indicator indicating whether the  
3 regulation error is positive or negative.

1 11. The method of claim 1, wherein the volume characterization is a  
2 table, the table comprising:

3 a plurality of data points, wherein each data point includes

4 a calibration volume data point, wherein the calibration volume  
5 data point represents a volume of the liquid to regulate,  
6 the calibration volume data point selected as part of a  
7 calibration process at the pipette; and

8 the correction volume, wherein the correction volume represents  
9 the amount of liquid regulated in the tip holder at the  
10 calibration volume data point.

1           12.    The method of claim 1, wherein the volume characterization is a  
2 table, the table comprising:  
3           a plurality of data points, wherein each data point includes  
4                a calibration volume data point, wherein the calibration volume  
5                data point represents a volume of the liquid to regulate,  
6                the calibration volume data point selected as part of a  
7                calibration process at the pipette; and  
8           the correction volume, wherein the correction volume represents  
9                the difference between the calibration volume data point  
10              and an actual volume, wherein the actual volume  
11              represents the amount of liquid regulated in the tip holder  
12              at the calibration volume data point.

1           13.    The method of claim 1, wherein the volume characterization is  
2 an equation.

1           14.    A device for regulating a requested volume of liquid in a liquid  
2 handling pipette by correcting for a current physical condition of the pipette,  
3 the device comprising:  
4           a body case;  
5           a tip holder, the tip holder mounted to the body case;  
6           a piston assembly, the piston assembly mounted to the tip holder and  
7                comprising a piston rod that fits within the tip holder;  
8           a piston drive mechanism, the piston drive mechanism comprising a  
9                control rod having a surface that contacts the piston assembly,  
10              the piston drive mechanism configured to move the piston rod of  
11              the piston assembly within the tip holder thereby causing  
12              regulation of a liquid in the tip holder;  
13           a volume selector, the volume selector mounted to the body case and  
14                configured to allow a user to select a requested volume, the  
15                requested volume representing the amount of liquid to regulate;  
16           a display, the display mounted to the body case;

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17 a processor, the processor coupled to the display and to the volume  
18 selector and configured to calculate a correction volume using a  
19 volume characterization, wherein the volume characterization  
20 characterizes a difference in the amount of the liquid regulated  
21 in the tip holder as a function of the requested volume, the  
22 volume characterization determined using a calibration process;  
23 wherein the display indicates the correction volume to a user of the  
24 pipette thereby regulating the requested volume of liquid in the  
25 tip holder.

1 15. The device of claim 14, further comprising  
2 a physical condition indicator, the physical condition indicator mounted  
3 to a portion of the device and configured to indicate a current  
4 physical condition at the device;  
5 wherein the processor is coupled to the physical condition indicator and  
6 further wherein the volume characterization further characterizes  
7 the difference in the amount of the liquid regulated in the tip  
8 holder as a function of the indicated current physical condition.

1 16. The device of claim 15, further comprising:  
2 a tip, the tip mounted to the body case;  
3 wherein the physical condition indicator is an indicator of a type of the  
4 tip.

1 17. The device of claim 15, wherein the physical condition indicator  
2 is a sensor.

1 18. The device of claim 17, wherein the current physical condition is  
2 selected from the group consisting of a temperature of the atmosphere at the  
3 pipette, a temperature of a portion of the pipette, a pressure of the  
4 atmosphere at the pipette, a pressure within a cavity of the pipette, a humidity  
5 of the atmosphere at the pipette, and a viscosity of the liquid.

1           19.    The device of claim 14, wherein the display is further configured  
2   to indicate the requested volume to the user of the pipette.

1           20.    The device of claim 14, wherein the correction volume is an  
2   actual volume, the actual volume representing the amount of liquid regulated  
3   in the tip holder based on the requested volume.

1           21.    The device of claim 14, wherein the correction volume is a  
2   regulation error, the regulation error representing a difference between the  
3   requested volume and an actual volume, the actual volume representing the  
4   amount of liquid regulated in the tip holder based on the requested volume.

1           22.    The device of claim 21, wherein the volume selector is further  
2   configured to allow the user to select a new volume, wherein the new volume  
3   includes the regulation error.

1           23.    The device of claim 21, wherein the display is further configured  
2   to display a high/low indicator to the user of the pipette, the high/low indicator  
3   indicating whether the regulation error is positive or negative.

1           24.    The device of claim 14, wherein the volume characterization is a  
2   table, the table comprising:  
3       a plurality of data points, wherein each data point includes  
4           a calibration volume data point, wherein the calibration volume  
5               data point represents a volume of the liquid to regulate,  
6               the calibration volume data point selected as part of a  
7               calibration process at the pipette; and  
8           the correction volume, wherein the correction volume represents  
9               the amount of liquid regulated in the tip holder at the  
10          calibration volume data point.

1           25.    The device of claim 14, wherein the volume characterization is a  
2   table, the table comprising:

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3 a plurality of data points, wherein each data point includes  
4 a calibration volume data point, wherein the calibration volume  
5 data point represents a volume of the liquid to regulate,  
6 the calibration volume data point selected as part of a  
7 calibration process at the pipette; and  
8 the correction volume, wherein the correction volume represents  
9 the difference between the calibration volume data point  
10 and an actual volume, wherein the actual volume  
11 represents the amount of liquid regulated in the tip holder  
12 at the calibration volume data point.

1 26. The device of claim 14, wherein the volume characterization is  
2 an equation.